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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/676,414  | 09/30/2003  | Janice H. Nickel     | 100110627-7         | 8074             |
| 7590  | 03/26/2004  |                      | EXAMINER            |                  |
| HEWLETT-PACKARD COMPANY<br>Intellectual Property Administration<br>P.O. Box 272400<br>Fort Collins, CO 80527-2400 |             |                      | WILSON, CHRISTIAN D |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2824                |                  |

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Up

|                              |                              |                  |
|------------------------------|------------------------------|------------------|
| <b>Office Action Summary</b> | Application No.              | Applicant(s)     |
|                              | 10/676,414                   | NICKEL ET AL.    |
|                              | Examiner<br>Christian Wilson | Art Unit<br>2824 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_.
- 2a) This action is **FINAL**.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_ is/are allowed.
- 6) Claim(s) 1-5,7-14 and 16-21 is/are rejected.
- 7) Claim(s) 6 and 15 is/are objected to.
- 8) Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 30 September 2003 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input checked="" type="checkbox"/> Other: <u>search history</u> .                   |

## **DETAILED ACTION**

### ***Specification***

1. The disclosure is objected to because of the following informalities: the abstract is not 50 to 150 words in length. The word divot is misspelled as “divet”.

Appropriate correction is required.

### ***Claim Objections***

2. Claims 6 and 15 are objected to because of the following informalities: divots is misspelled as “divets”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 – 4, 7 – 12, 14, and 16 – 21 are rejected under 35 U.S.C. 102(e) as being anticipated by Daughton *et al.*

Regarding claim 1, Daughton *et al.* (US 6,538,921) discloses a method of fabricating a magnetic memory element comprising the steps of forming a ferromagnetic data layer **12** with a controlled nucleation site [column 23, lines 5-10].

Regarding claim 2, Daughton *et al.* further discloses a nucleation site that is not surrounded by a neighboring region of the data layer [Figure 9B].

Regarding claim 3, Daughton *et al.* further discloses a nucleation site that has a lower switching threshold relative to a neighboring region of the data layer [column 23, lines 5-10].

Regarding claim 4, Daughton *et al.* further discloses nucleation sites formed at the edges of the data layers [column 22, line 58].

Regarding claim 7, Daughton *et al.* further discloses data layers with at least one additional nucleation site [column 22, lines 23-29].

Regarding claim 8, Daughton *et al.* further discloses data layers with a symmetric arrangement of nucleation sites [Figure 9A].

Regarding claim 9, Daughton *et al.* further discloses data layers with a non-symmetric arrangement of nucleation sites [Figure 9B].

Regarding claim 10, Daughton *et al.* further discloses nucleation sites with uniform size and shape [Figure 6].

Regarding claim 11, Daughton *et al.* further discloses forming additional magnetic tunnel junction layers **16, 17, 18**.

Regarding claim 12, Daughton *et al.* discloses a method of fabricating a data storage device comprising the steps of forming an array of ferromagnetic data layers **12** with first and second neighboring regions where the first region has a lower switching threshold than the second region [column 23, lines 5-10], and the first region is substantially smaller than the second region [Figure 9B] and located on the same location on the data layers across the array [Figure 1].

Regarding claim 14, Daughton *et al.* further discloses first regions formed at the edges of the data layers [column 22, line 58].

Regarding claim 16, Daughton *et al.* further discloses data layers with more than one first region [column 22, lines 23-29].

Regarding claim 17, Daughton *et al.* further discloses data layers with a symmetric arrangement of first regions [Figure 9A].

Regarding claim 18, Daughton *et al.* further discloses data layers with a non-symmetric arrangement of first regions [Figure 9B].

Regarding claim 19, Daughton *et al.* further discloses first regions with uniform size and shape [Figure 6].

Regarding claim 20, Daughton *et al.* further discloses first regions formed during bit formation [column 5, lines 50-67].

Regarding claim 21, Daughton *et al.* further discloses forming additional magnetic tunnel junction layers **16, 17, 18**.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daughton *et al.* in view of Deak.

Daughton *et al.* teaches the limitations of claims 1 and 12 as described above and further teaches nucleation sites on the edges of the data layers but not at the corners of the data layers. Deak (US 6,570,783) teaches an MRAM cell with nucleation sites on the corners of the data layer [Figures 10a – 10c]. It would have been obvious to one of ordinary skill in the art to have nucleation sites at the corners of the data layer in the device of Daughton *et al.* since Deak teaches that this placement is highly desirable since it increases the write margin due to the difference in switching fields [column 7, lines 12-30].

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

#### ***Allowable Subject Matter***

8. Claims 6 and 15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter: in the context of the entire claim, applicant discloses novel controlled nucleation sites which are divots or protrusions.

***Conclusion***

10. A copy of the search history (EAST and STN) is enclosed.
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886. The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2800.



Christian Wilson, Ph.D.  
Patent Examiner  
Art Unit 2824

CDW